

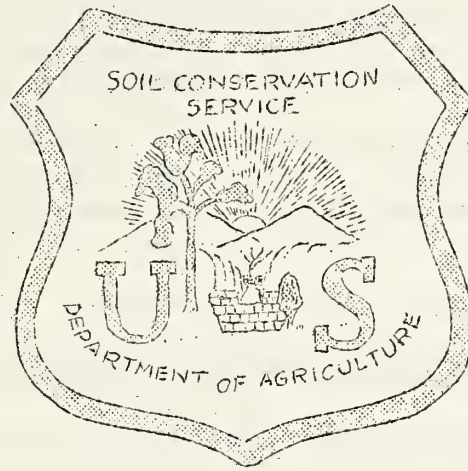
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DAKOTA ZEPHYR

NOVEMBER - DECEMBER 1935

VOL 1 NUMBER 6



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Soil Conservation Service
Region No. 9

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REGION No 9

PROJECT No SD1, HURON, S. DAK.

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ANNOUNCEMENTS

VOLUNTARY SOIL CONSERVATION ASSOCIATIONS

The following Voluntary Soil Conservation Associations have been organized or are in the process of organization:

Hitchcock Voluntary Soil Conservation Association --
Beadle County, S. D.
Jerauld County Voluntary Lakes & Soil Conservation Association --
Jerauld County, S. D.
Silver Creek Voluntary Soil Conservation Association --
Sanborn County, S. D.
Fordham-Logan Voluntary Soil Conservation Association --
Clark County, S. D.
Tulare Voluntary Soil Conservation Association --
Spink County, S. D.
Huron Voluntary Soil Conservation Association --
Beadle County S. D.

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CONCERNING WEATHER OBSERVATIONS

The Soil Conservation Service desires to secure accurate information regarding the amount of rainfall in the vicinity of Wolsey, Broadland, Cavour, Yale, Sheffield and Huron.

A number of rain gauges have been secured for this purpose. It is hoped that these gauges may be placed with interested parties who will devote a few minutes each day to recording the amount of rain that has fallen.

Any person interested in this work is requested to write the Soil Conservation Service, Huron, South Dakota, for further information.

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RADIO PROGRAMS

Radio talks will be given by members of the Soil Conservation Service staff

Thursdays at 2:00 P.M. -- KGDY -- Huron, S. Dakota
Saturdays at 12:45 P.M. -- KFDY -- Brookings, S. Dakota
Farm Flashes from the U. S. Department of Agriculture
from both of these stations daily.

TUNE IN!

THE DAKOTA ZEPHYR

Published Monthly
For the Benefit of Soil Conservation Cooperators
By the Staff of the Soil Conservation Service
United States Department of Agriculture
Huron, South Dakota
H. J. Clemmer, Regional Conservator

Editor: J. G. Hutton

Contributors: Members of the Staff

Volume 1.

NOVEMBER-DECEMBER 1935

No. 6

Greetings, Cooperators and all interested in saving the soil! May the old year end pleasantly and the New Year begin hopefully.

Owing to conditions beyond our control, it seemed desirable to issue just one number of the "Zephyr" for November and December combined.

It is hoped that the new style of type may meet your approval, and that it may make the "Zephyr" more easily read.

There are literally too many ups and downs in farming. Farming to be successful must be on the level.

Contour farming means farming on the level -- across the slopes instead of up and down the slopes. Contour farming goes far in preventing erosion of the soil by running water.

In this number of the "Zephyr", you will find a number of articles by members of the various departments of the Soil Conservation Service. Soil conservation requires a complete farming program and these articles indicate the various kinds of work that are being performed in the project areas.

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Soil conservation is not something that can be accomplished in a year or two and then be forgotten. Soil conservation must go on as long as people eat food and wear clothing. The various soil conservation projects are demonstrating how the work can be done on the farm -- the only place, after all, where soil is ruined or preserved.

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"The longest journey begins with a single step." -- Chinese Proverb.

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AGRONOMY

In planning crop rotations or the proper sequence of crops for a particular farm in any given area, such factors as climate, rainfall, and soil type must be considered. It is necessary also to study adaptable varieties of suitable crops for the most economical returns. Each farm in a given locality presents individual peculiarities which require special treatment.

Since a considerable amount of the top soil in practically all eroded areas has been lost, it is of primary importance to consider the cropping system for each individual farm. For example: A three-year crop rotation of corn, small grain with sweet clover and sweet clover plowed-under or pastured the third year, affords a balance of economic importance. The corn and oat crops afford a cash or feed crop while the clover crop plowed-under as green manure will add organic matter. A four, five, or six-year rotation may be used by arranging suitable crops in proper sequence. Usually nature, under normal conditions will do its part provided, however, that the soil contains sufficient plant food to support the growing crop.

Because of excessive soil blowing in some localities, many farms have become impoverished and denuded of vegetation. Special treatment under such circumstances is essential to restore soil fertility for the production of profitable crops. Under practically all conditions vegetation or some cover crop, plays an important part in preventing soil from being blown or washed away. According to information obtained during the year on some farms located in badly eroded areas, oats and winter rye broadcast and listed and corn and cane listed at right angles to the prevailing wind have proved beneficial in checking the blowing of soil.

As stated above, a study of a particular farm in question is necessary insofar as its requirements are concerned. A livestock farm may require more feed and pasture crops than a straight grain farm. The cropping system, of necessity, will vary depending on requirements and severity of soil erosion. Under any circumstance, however, a sequence of crops should be planned in order to restore soil fertility by adding organic matter.

In view of the need for improved farm practice in land utilization to provide better protection to field crops, it may require a better balance or re-arranging of our cropping system to obtain the most economical returns. All practical methods of cropping are to be employed to help restore the farm to economic production and to prevent waste by erosion.

A. D. Ellison,

Chief Agronomist.

ENGINEERING

SMALL DAM CONSTRUCTION

The source of the water supply in the northern plains states is precipitation in the form of rain or snow, and while the demand for water is practically constant, precipitation is intermittent so that water must be saved from shower to shower in order that livestock and farm crops may survive. Recent experiences show how terrific losses may be where there is lack of water.

Terracing and contour cultivation are efficient means of holding water on the land until it can be absorbed for the use of growing crops or to raise the water table in the ground to supply wells, while the construction of small dams at strategic points creates lakes that provide water for cattle, sanctuaries for wildlife, some measure of flood control, and last, but not least, increased recreational advantages. Properly constructed dams will go far in preventing loss of cattle due to inadequate water supply.

The construction of dams on the demonstration projects in Region 9 is on a cooperative basis, the farmer furnishing the materials and the Service the labor and construction equipment, but donation of equipment by cooperator is desirable.

A dam to be of value must be well constructed, otherwise, it may be worse than no dam at all. For this reason, the dams are generally of earth construction containing a spillway constructed of field stone laid in mortar. The spillways are designed to carry the maximum flood that might be expected to occur over a considerable period of years, therefore, the dam can be considered permanent in nature. The actual expense to the farmer in the construction of a dam consists in furnishing the sand and cement to build the masonry spillways and furnishing sheet piling where necessary. When a request is received, the engineers make a survey of the proposed site, compute the volume of water stored and the quantities of materials involved in construction. If the cooperator can furnish the estimated quantities of material and the site is feasible, then a special clause is inserted in the standard agreement which when signed permits work to begin. Dams are constructed only on property where the owner agrees to the general program of soil conservation on his farm and willing to permit public access to the lake for community benefits.

Cooperators interested in the possibility of dam construction on their farms are invited to make contact with the Soil Conservation Service either through the contact man or directly with the field office.

L. C. Tschudy

Chief Engineer.

FARM MANAGEMENT

The time of the year is rapidly approaching to make a survey of the farm business, showing the valuation of the stock, equipment, and supplies. We are sure that many of our cooperators do keep business records of some kind or other. Just how detailed these records are, of course, varies with the amount of time each man puts on the record work. A few minutes spent each day in setting down in a simple business record the receipts and expenses of the farm business will enable the operator to know at the end of the year just where his money came from, what he spent it for, and how much he had left out of each operation.

We all realize, I am sure, that farming is a business more complicated than any other business in which men engage. The farmer must be more thorough and have a better knowledge of his business than does the man who runs a department store in any city. Ninety per cent of the failures in the mercantile world are due entirely to the lack of good records and the lack of an understanding on the part of the merchant of the records which are kept. How many failures in the farming business are due to this, it is hard to determine. However, it is certainly an absolute fact--a fact which has been demonstrated by farmers themselves -- than even though the weather is not favorable for the production of good crops, the business record is more valuable than most of us are willing to acknowledge. Anyone can make money when weather, soil, and markets are favorable but only the best of business men can make a success under adverse circumstances.

A farm business record does not need to be complicated. Frequently we find someone who hesitates because of the terms which are involved in the book. However, these terms are plain when one has the real will power to go ahead with the work and an explanation given of the unusual parts.

Another very important reason for keeping farm records is their great value in making an income tax return. The results of our business transactions in 1935 will not, in most cases, make necessary an income tax report, but South Dakota agriculture is coming back. There is no doubt that we shall again see the prosperous farm conditions which have been experienced in this state. If such is the case, the farm operator, because of the lack of records, will lose more money in just one single report than it would cost to employ one of his family to keep his farm records for in addition the business record would save the annoyance and embarrassment of trying to patch up an income tax report without records from which to make it.

The keeping of a farm business record in many cases is just simply the formation of a new habit or it is at least the development of a habit which has already been formed. We would not, at any time, think of retiring at night without having done all the evening chores, without having milked those good cows, without having fed those good hogs, without having cared for the horses so that they would be ready to work the next day; yet many leave this all important part, the recording of the business transactions, out of their plan of daily activities. The Conservation Service, in cooperation with the Extension Service of your county, expects to put out a simple farm record book for 1936. Meetings have been held in five centrally located community centers to explain this work to you and to help you start this record. At least one hundred good farm business records are needed from the Beadle County areas for 1936.

You will have efficient help in keeping this record. Our contact men will check with you upon every visit and will make special visits to your farms if you need additional assistance in keeping this record. They will study the record each time they come to your farm to see if any change can be made which will make your farm business more profitable.

You will not be asked to summarize your book at the of the year. The Soil Conservation Service and the Extension Division of your State Agricultural College will do that for you and then return the book to you with a thorough analysis of it. We are hoping for your most hearty and earnest cooperation.

The business record, with its final summary and analysis, is the foundation of any real benefit you may receive from the Soil Conservation Service or Extension Program because it enables you not only to perfect your present farm organization plan but enables you to build for the future.

If you were unable to attend any of the meetings, come in and let's talk it over or write us about it.

I. N. Chapman,

Conservationist in Farm Management

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"If the art of agriculture has ruined land, the science of agriculture must restore it; and the restoration must begin while some farmers are still prosperous, for poverty-stricken people are at once helpless and soon ignorant. Outside help will always be required to redeem impoverished soils, for poverty makes no investments, and some initial investment is always required for soil improvement."

Cyril G. Hopkins, 1910.

SOILS

For the past six months, the members of the Soils Department have been mapping and classifying the soils of the area. The survey shows that there is not less than 18 different types of soil, each one with its individual characteristics. Some of these types, like the Barnes fine sandy loam, are easily blown and in some cases have lost from six to ten inches of their top soil. Other types, like the Beadle silt loam, have lost very little by blowing. Where the soil has been farmed without proper care -- crops not rotated, no manure applied, etc., -- blowing has been much more serious than on similar soils types which have been farmed in a careful manner. As a rule, the survey is showing that the careless farming systems are very destructive of soil resources -- while systematized farming methods have tended to conserve the soil.

While the survey is by no means completed, enough evidence has been secured to indicate that within the borders of the project area, comprising approximately 190,000 acres, erosion losses have been enormous.

To date 65,120 acres have been surveyed. The survey shows that 42,266 acres have been affected by wind erosion. Of this affected area, it is estimated that 65% or 27,473 acres has lost an average of three inches of top soil and 35% or 14,793 acres has lost an average of six inches of top soil.

Just what this loss means in terms of money values is difficult to determine, but the seriousness of the situation is shown by the following facts:

It is known that the amount of nitrogen in the soil is an excellent indicator of its crop producing powers. Also, that each acre of good soil to a depth of six inches contains 4,000 pounds or more of nitrogen. As one bushel of corn contains one pound of nitrogen, it is reasonable to assume that each acre of good soil contains sufficient nitrogen to provide for an annual crop of 40 bushels of corn for 100 years.

In other words, this means that in this one small section of South Dakota, wind erosion has caused permanent soil losses equivalent to a possible 114,156,000 bushel crop of corn that might have been produced during the next 100 years. But that is not the whole story. The survey shows large areas covered with unproductive and moving sand. Areas of exposed subsoils, most of them heavy clays, areas of abandoned lands that drift and ruin adjacent lands. In no case has an area been found that was better than it was ten years ago. This means that not only has the present land owner suffered, but that his children and his grandchildren will continue to suffer unless something is done about it. Not only that but unless this wind erosion is stopped, there will be nothing for the children and "The Great American Desert" will be an actual fact.

Paul Emerson

Chief Soils Expert.

GRASS

KEEPS SOIL FROM BLOWING

Grass Keeps Soil From Blowing by providing it with a permanent plant cover. It is the native and original soil protector in the grass-land region. Crested wheatgrass, smooth bromegrass, and western wheatgrass are well adapted to this region and seeds are being distributed to cooperators in wind erosion control.

Crested Wheatgrass was imported from Eurasia. It has lived through droughts and may be grown on sites too dry for bromegrass to survive. Growth stops during the hot, dry summer but starts again in the fall to give late pasturage. Good care is necessary at the start. It grows in clumps and fills in by seed. Crested wheatgrass seed makes a valuable cash crop. The hay is of good quality and is liked by livestock.



Smooth Brome was imported from Europe and is widely grown in South Dakota, where it yields heavy crops of good hay. It forms a heavy sod and stands up well under pasturing.

Western Wheat is the tall, straw-colored native grass common in meadows and pastures. It came through the last drought and, no doubt, will come through the next one. It makes good quality hay if cut at the right time. It spreads by rootstocks, which form a sod and also from seed.

R. W. Caird,

Assistant Range Examiner.

FORESTRY

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WINDBREAK CLEANING

Many of our cooperators feel that their present windbreaks, shelterbelts and old tree claims are not worth saving. In some cases, this is no doubt true.

Where the groves are dead or very nearly so, the trees are cut down and worked up into fuel and fence-post material, the stumps grubbed out, and the area placed under cultivation or pasture.

Where the new groves show considerable life as indicated by volunteer seedlings, and by suckers from the base of the weakened trees, it may be desirable to make an improvement cleaning. In many cases a new windbreak can be secured sooner by this method than by establishing a new planting.

Let us not make the mistake of discarding an old windbreak if there is a fair possibility of saving it and establishing it by natural reproduction.

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NEW WINDBREAKS

In an effort to help check wind erosion, the Soil Conservation Service and other government agencies are encouraging the planting of new windbreaks and shelterbelts.

Many instances have been observed where windbreak plantings have not only checked wind erosion but also increased crop yields to the leeward of the planting, while those to the windward were blown out.

Windbreak plantings not only increase the value of the farm but also improve the appearance of the farm.

Much of the area about the farmstead is used so intensively that it is bare much of the year. For this reason, it is more subject to blowing than the land devoted to crops.

Windbreak plantings about farmstead sites protect the most valuable part of the farm--buildings, yards, gardens, and orchards. They make living conditions much more pleasant.

P. L. Keene

Associate Forester.

WILD LIFE

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We use the term "wildlife" to include birds, both song and game, fur-bearers, game animals, rodents, and fish. It designates the living creatures on a farm as distinguished from the domestic life.

The welfare of wildlife depends, primarily, on the major activities of land utilization on the farms and public lands. The Soil Conservation Service is principally interested in demonstrating what rehabilitation can be accomplished on the farms. In conjunction with the best practices of all major farming activities, environment for wildlife will be improved.

The Biologists, who are in charge of wildlife restoration, recognize the value of fur-bearers and game to a farm. They are also aware of the present lack of inducement for the farmer to produce a crop of game birds for a sportsman consumer. The value of fur-bearers is better known to everyone.

Regarding game birds, it is the intention of the Biologist to satisfy both farmer and hunter that it is possible to so manage a farm that a stable number of birds can be produced each year. Then an agreeable arrangement can be substituted for the misunderstandings that now prevent either from seeing the viewpoint of the other.

There are certain conditions respecting the needs of wildlife nesting, feeding, and protection that are required. They can be attained by the farmer -- must be provided by him -- in fact, either by practicing good farming methods or allowing waste lands to produce it. The first practice is the desirable one, of course.

This single page will not allow a discussion of the several methods employed to improve wildlife environments. It is appropriate to say, however, that the methods will be practical and simple. When the results show that management of the farm is the chief factor that regulates wildlife abundance - that a crop can be produced - a method of making that crop marketable will be initiated.

If you are interested in wildlife development, there will be more interesting explanations of the methods used, and the reasons for their selection, in each succeeding Zephyr. These will deal with but a single phase of the work in each article. So you will want to keep them in order to get a composite picture of the wildlife management operations.

Verne E. Davison,

Associate Biologist.

OUR C.C.C. CAMPS

How can I help being enthusiastic about our camps when I see the fine, useful projects being built by our CCC boys? Let me take you for a visit to one of these camps.

"Good Morning, Mr. Superintendent, how are things going at your camp?"

"Well, we are getting along just fine! Yes, sir, just fine!"

"It surely looks nice and clean around the camp grounds here; but tell me, what do you mean by 'just fine'?"

"Well, I mean that the boys say the quarters in which they are housed are warm and comfortable; that they like the work in building this big dam; that there is no friction or bad feeling among the boys; that they seem to enjoy their food, because they are all putting on weight; that they are getting healthier and stronger every day; that they get along fine with my foremen and engineers, and also with the officers in charge of the company.

"Then, too, I mean that they have a sufficient amount of recreation after working hours and on Saturdays and Sundays such as kicking the football, attending dances, movies, reading newspapers and magazines which are supplied free to them by local citizens, their friends and relatives; and playing other games which the boys really make up themselves.

"You know, the boys are also taking very strong interest in learning how to operate and take care of trucks and tractors and other heavy machinery and equipment. They just love to drive a tractor or a truck. Consequently, these jobs are pretty much desired by most of the boys. This is a good thing, because we are sure that the boys drive carefully in operating such machinery, and take good care of it by keeping it well cleaned, greased and oiled at all times. They know that if they don't take good care of this equipment, that some other boy who is on the waiting list will get this job.

"I also mean that the boys are getting an education in studying after working hours, such as mechanics, English grammar, surveying, typewriting, road building and different construction problems. These studies are under the supervision of the Camp Educational Adviser, and I certainly was surprised when he told me the other day that over 80% of the boys were taking some kind of a course. The boys do not have to take these courses--they just do so voluntarily because, I suppose, they like to better themselves."

"Yes, and how is the work on the project getting along?"

"Well, as I said before, everything is fine! I mean that the earth for the dam was moved in less time than we estimated; sheet piling has been driven in by the boys with heavy mauls and is matched so tight that no water will seep through; the masonry work was completed much faster than I thought we could do it, as it seems like the boys were anxious to see how the job looked when it was done. As you can see, the rip-rapping is almost finished; and see how those boys are carefully laying those stones in place so that the job is going to look mighty good when it is completed.

"Yes, those are the things I mean when I say 'everything is getting along fine'. There are many things that I would like to tell and show you, but that would take several days' time, and I know that you haven't much time because you have to visit more camps, and that you cannot stay very long. I do, however, want you to come around this bend as I want to show you a crew of the boys actively engaged in the side project. You see the boys beyond that small hill?"

"I sure do!"

"Do they look to you as though they are dissatisfied or loafing?"

"No, by gosh, they look like they are working in dead earnest using those picks and shovels and wheelbarrows like experts?"

"Well, they certainly are, and just because they are doing the kind of work that builds good projects which will be useful, not only for the present, but for many years to come. They are proud of these projects, and so am I. They don't only build good projects, but by doing this good work they also build character and the morale of the boys is improved more than any one can know."

"Yes, everything sure does look mighty fine to me! You know, Mr. Superintendent, I just can't help getting more and more enthused about these camps and the boys and the good work they are doing as time goes on. They are building living monuments which will stand, as you said before, for many years to come. It certainly is a great work, isn't it?"

"I'll say it is, and I sure like it!"

"Well, I must be getting on the way, so goodbye, good luck, and keep up the fine work!"

"Will see you again next month---goodbye to you, and good luck!"

B. J. Dieringer

Associate Technician

THE POWER-DUTTON WIND EROSION CONTROL AREA GREAT FALLS, MONTANA

The business of organizing the Power-Dutton wind erosion control area situated in Cascade and Teton counties, Montana, began with the arrival of the project manager at Great Falls on September 15, 1935. Permanent office space was leased on the fourth floor of the Medical Arts Building. The warehouse-garage is located three blocks east of the office at 810 First Avenue North. The front end of the warehouse has been prepared for a drafting room.

The area is nineteen miles northwest from the city of Great Falls, is traversed by the Great Northern Railway and U. S. Highway No. 91. The area consists of two projects approximately eight miles apart. The Power project in Cascade County consists of 14,080 acres and the Dutton project in Teton County consists of 17,920 acres. The total project area is 32,000 acres.

The farms are large and vary in size from 400 to approximately 2000 acres. Crops include wheat, mustard, oats and saflower. Mustard and saflower are grown very much as is wheat. Saflower is grown for oil which is used in paint. The bulk of the crop is wheat. Approximately fifty per cent of the land is in crop any one year. The tendency is to summer fallow the other fifty per cent. It is the fallow land which creates the wind erosion problem.

Rainfall on the project area varies between twelve and thirteen inches and falls largely during the growing season. Damaging winds come from the west and southwest. Very little, if any, soil movement results from winds blowing from any other direction.

The predominant soil types are Scobey and Morton. Three of the Scobey types are found on the Dutton project and are all glaciated. The Morton is found on the Power project and is mostly residual, having been developed from the shale of the Colorado series.

With a few exceptions ground water in soils is not available on the area. This precludes the possibility of livestock development to any extent. Livestock is largely confined to milk cattle. Sheep are grazed on the stubble to utilize wheat which has been wasted in harvesting. A few ponds to trap flood waters furnish water for some livestock and a few homes. Most homes depend upon cisterns for water storage. Most of the water is hauled from artesian wells 11 to 16 miles distant.

Very few horses are used for power. Mechanical equipment in large units to conduct farming operations is the general order.

Farmers living on the area are progressive and of a high class. Most of the homes are of the modern small bungalow type appropriately painted and of excellent appearance. Shelterbelts around the farm home is the rule.

Soil Conservation Associations have been organized on each of the projects and the cooperators are showing keen interest in the program. Signing of cooperators on cooperative agreements is under way.

From "The Montana Soil Conservationist."

WINNER-DIXON AREA

S. D. NO. 2

Business is picking up on the Winner-Dixon Area. We started men to work September 16 and have had around ninety on the labor payroll since the middle of October. In spite of the fact that all labor has been hand work, due to no power equipment, the boys have leveled soil drifts around buildings amounting to thirty-nine acres; have removed soil drifts from 1113 rods of fence, and have rebuilt 407 rods of fence. We are also doing the preliminary work on the construction of a dam for Maurice Remot. Little field equipment has arrived, but practically all the office equipment is here.

Detailed soil survey has been completed on approximately 20,000 acres. The contract men have just recently gotten into action, but to date have around 20 contracts for completion.

The administrative staff now number twelve. Regular semi-monthly staff meetings are held to discuss different phases and problems of the program.

L. M. Sloan,

Project Manager.

PARK RIVER AREA

N. D. NO. 1

PROGRESS OF SOILS WORK

Due to the fact that this area is located on the old shores of Glacial Lake Agassiz, the soils are exceedingly variable grading from coarse sands and gravel to very heavy clays. Naturally the first step has been to accurately classify all variations and thus define the types. This has been accomplished by digging four foot square pits to a depth of six feet and securing descriptions of all soil variations. To date, 38 pits have been dug. 19 profiles have been secured and 8 of these have been mounted for exhibition.

In addition, a large number of surface samples have been secured. It is hoped that all of these may be tested in the laboratory in order that information may be secured regarding the plant food requirements of the soils. Such information should be of great value in enabling the Agronomists in making recommendations for larger yields, improved quality and better soils.

Paul Emerson, Chief Soil Expert.

WHAT SOIL IS

Soil is the outermost part of the crust of the earth which consists of loose material derived from the natural breaking up the rocks by the physical and chemical agencies of weathering. This material has been modified by the action of plants which have grown upon it and whose roots and bodies have become mixed with the rock material.

It takes thousands of years for a soil to develop upon the loose, fine-grained rock material, because at first the plants that can grow upon the raw rock material are limited in their growth and the rate of accumulation of organic matter from the decaying plants is very slow. However, if time enough elapses during which the conditions are favorable for plant growth, partly decomposed organic matter will accumulate in the top soil and change its color to a darker hue. Where the accumulation goes on for thousands of years, the dark colored top layer may become several inches or even a foot or two in depth. This is the "top-soil" which contains most of the nitrogen accumulated from small amounts of nitrogen compounds coming down in the rain and from the action of bacteria in the soil and on the roots of legumes. Most of the chemical action which dissolves the mineral plant food for the use of plants goes on in this layer.

Since the top-soil is the part of the soil in which most of the feeding of growing plants goes on, it is easy to see that it must be preserved if crops are to be grown. It is a fact that this layer of top-soil is the only defense humanity has against starvation and nakedness. It is also true that the subsoil underlying the top-soil does not possess the crop producing qualities of the top-soil and could not change to top-soil except after centuries of action by topsoil-forming processes.

The top-soil varies in texture. It may be sand, sandy loam, loam, silt loam, clay loam, or clay, depending upon the sizes of the soil particles and the percentage of each contained in the soil.

The subsoil may vary as to texture and structure, that is, the size and arrangement of the soil particles. Subsoils may range from gravel to clay and it is partly on the basis of the subsoil that soils are divided into groups and given names so that they may be described and studied. One of these soil groups is usually called a soil series and has the same kind of subsoil throughout the textural series of top-soils. In the soil survey reports, descriptions of these soil series are given in detail.

J. G. H.

ADDITIONS TO THE LIST OF COOPERATORS

SINCE THE LAST REPORT

<u>Name</u>	<u>Address</u>	<u>Owner or Tenant</u>	<u>Land Description</u>
Kleinsasser, Joe E.	Huron, S. D.	Tenant	NW $\frac{1}{4}$ Sec. 6-112-60 and
Clemmons, Fred	Clemons, Ia.	Owner	NE $\frac{1}{4}$ Sec. 1-111-61
Hofer, Joshua J.	Carpenter, S.D.	Owner	NW $\frac{1}{4}$ Sec. 14-113-60
			E $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 11-113-60 and
			NW $\frac{1}{4}$ Sec. 22-113-60
Christopherson, Lambert	Wolsey, S.D.	Owner	SW $\frac{1}{4}$ Sec. 14-111-64 and
			NW $\frac{1}{4}$ Sec. 12-111-64
Minium, Wilford	Wolsey, S.D.	Owner	SE $\frac{1}{4}$ Sec. 12-112-64
Braun, L. E.	Wolsey, S.D.	Owner	SE $\frac{1}{4}$ Sec. 32-112-63
Haeder, Richard	Yale, S. D.	Owner	NW $\frac{1}{4}$ Sec. 13-111-60
Tschetter, Edmund	Yale, S. D.	Tenant	S $\frac{1}{2}$ Sec. 20 and
Crosby, George	Winnebago, Minn.	Owner	S $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 20-112-60
Moeller, Henry	Cavour, S.D.	Tenant	W $\frac{1}{2}$ Sec. 22-111-60
Lindquist, Harry	Cavour, S.D.	Owner	
Bethel, W. V.	Carpenter, S.D.	Tenant	W $\frac{1}{2}$ Sec. 24-114-59
Central Life Assur. Soc.	Des Moines, Ia.	Owner	
Pierce, Neil	Wolsey, S.D.	Tenant	S $\frac{1}{2}$ Sec. 10-112-64
Pierce, Mrs. G. E.	Wolsey, S.D.	Owner	
Minium, Wilford	Wolsey, S.D.	Owner	
Glanzer, Dave P.	Wolsey, S.D.	Tenant	NW $\frac{1}{4}$ Sec. 14-111-64 and
Federal Land Bank	Omaha, Neb.	Owner	NW $\frac{1}{4}$ Sec. 15-111-64
Sweeney, James	Yale, S.D.	Owner	SW $\frac{1}{4}$ Sec. 6-111-59
Wedel, Henry	Yale, S.D.	Owner	Part of SE $\frac{1}{4}$ Sec. 9
			SE $\frac{1}{4}$ Sec. 10-112-60
			SE $\frac{1}{4}$ Sec. 12-111-64
Balvin, Anton	Wolsey, S.D.	Owner	E $\frac{1}{2}$ Sec. 9-111-64
Balvin, Mary	Wolsey, S.D.	Owner	SW $\frac{1}{4}$ Sec. 12-112-64
Minium, Wilford	Wolsey, S.D.	Tenant	
Raker, J. E.	Remsen, Ia.	Owner	
Brent, George	Carpenter, S.D.	Tenant	SE $\frac{1}{4}$ Sec. 10-114-59
Hinman, S. Tena	Los Angeles,		
	Calif.	Owner	
Mullins, George	Wolsey, S.D.	Owner	NE $\frac{1}{4}$ Sec. 23-111-64
Smith, E. D.	Wolsey, S.D.	Tenant	E $\frac{1}{2}$ & SW $\frac{1}{4}$ Sec. 10-110-63
Barber, W. A.	Riverside,		
	Calif.	Owner	
Haffner, Sam Jr.	Huron, S.D.	Tenant	SW $\frac{1}{4}$ Sec. 24 & NE $\frac{1}{4}$ 25-110-61
Phelps, P. H.	Rapid City, S.D.	Owner	
Fullman, Joe S.	Yale, S. D.	Owner	SW $\frac{1}{4}$ -SE $\frac{1}{4}$ Sec. 16)
			NW $\frac{1}{4}$ Sec. 21)- 112-60
			NW $\frac{1}{4}$ -NW $\frac{1}{4}$ Sec. 28)

-----O-----

Total number of farms under contract -- 183 -- including 47,515 acres.

Total number of applications not worked -- 146 -- including 39,965 acres.

-----O-----

LOOKING BACK

It seems a long way back to February, 1935, when viewed from the standpoint of soil conservation. That was the time when operations began on the South Dakota Project. The first days were marked by the arrival of the Regional Director and the opening of an office.

It was winter then, as it is now, and the Soil Conservation Service -- then called the Soil Erosion Service -- was only a name to most people in the state although a general soil erosion survey had been made during the autumn of 1934.

The Regional Director began to assemble his staff of workers and some office equipment arrived, but it was a long time before there were any chairs for visitors who came in to inquire about the Soil Erosion work.

The days passed and then meetings were held at several points in the area where the soil saving program was explained and landowners and farm operators began making applications for cooperative agreements which provided for changes in methods of tillage, crop rotations, and land utilization designed to control soil drifting and to provide a continual crop cover.

Then machinery arrived and drifts of soil along fences, in fields, and around buildings began to be moved and demonstrations made to show how the soil could be kept in place by listing and planting crops which would afford protection. Some grass seed, sweet clover seed, alfalfa seed, oats, and barley were furnished to cooperators who cooperated in the demonstration of erosion control methods.

During the fall, much work has been done on farms of cooperators by WPA workers in cleaning windbreaks, soil drifts, etc., the work being of benefit to the public as well as to the actual land concerned.

After the project was started at Huron, South Dakota, new projects were authorized at Winner, South Dakota; Park River, North Dakota; and one near Great Falls, Montana. Recently six groups of land owners in five counties in South Dakota began the organization of Voluntary Soil Conservation Associations and others have the same proposition under consideration.

Within the Huron areas -- Wolsey and Shue Creek -- 183 farmers representing 47,515 acres of land have signed cooperative agreements while 146 farms aggregating 39,955 acres are waiting to have agreements to be signed. And all this during ten months.

Looking back, we want to express our appreciation of the cooperative spirit of all who have been concerned in the progress of the work.

J. G. H.

THE LAST LEAF

1935

DECEMBER						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

The book of 1935 is completed and on its pages are the records of the year. Looking backward we have reason to be thankful for the past and hopeful for the future. Nature has been kinder this year and we ourselves have tried to do a little better.

We are still at peace with the world while some nations are in the throes of war.

We know better than ever before that facts and not fancies are the foundation of human existence and that we can not make something out of nothing.

Our dream of a lifetime that the Soil might one day receive the recognition which it deserves seems to be coming true.

The book of the year records the fact that our government is cooperating with the farmers of the nation in a constructive program of soil saving and conservation, recognizing the fact that our only fortification and defense against starvation and nakedness is the thin layer of fertile topsoil --a layer of loose material, as an average, not more than nine inches in thickness over the United States.

Tomorrow we shall open the new book, the book of new opportunity, with its new pages as yet untouched by the recording hand of History. It will be January, 1936, instead of December, 1935. We shall have one more day than we had in 1935 in which to do something worth while.

There will be more people interested in the common cause of soil saving and more hope and happiness in the lives of those who carry on.

The members of the staff of the Soil Conservation Service appreciate more than they can tell you the friendly cooperation and the neighborly kindness which you have extended to them since the South Dakota project was established ten months ago.

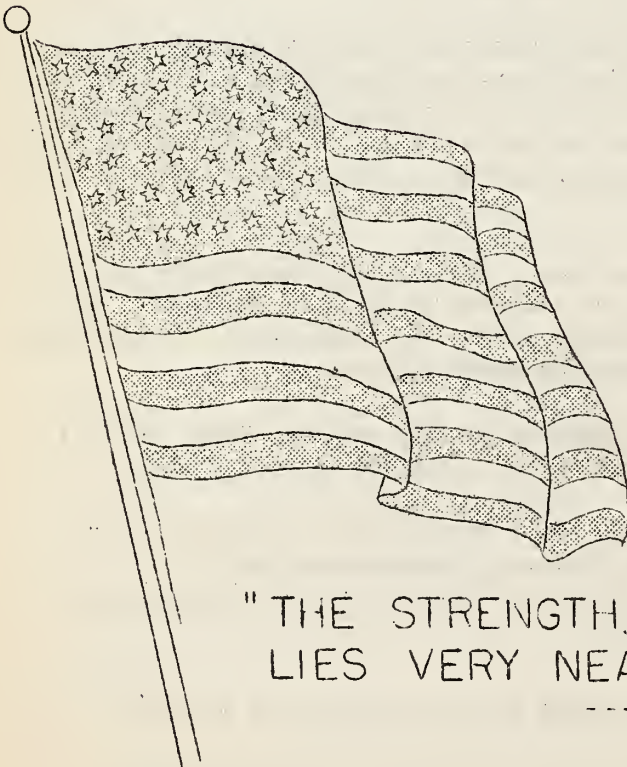
May your Christmas be merry and your New Year happy!

UNITED STATES
Department of Agriculture
Soil Conservation Service

Penalty for private use to
avoid payment of postage, \$300.

H. J. Clemmer, Regional Conservator
Huron, South Dakota

--Official Business



"THE STRENGTH OF THE NATION
LIES VERY NEAR THE SOIL"

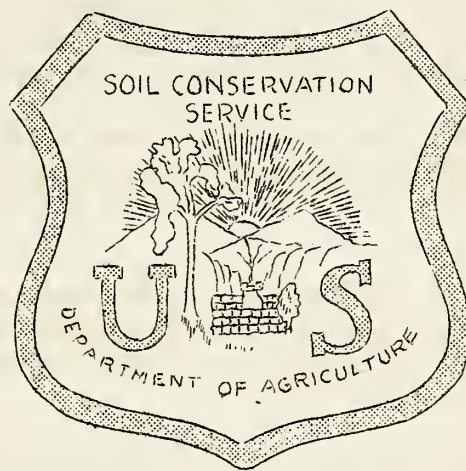
----- DANIEL WEBSTER

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DAKOTA ZEPHYR

NOVEMBER 15, 1935

SPECIAL EDITION



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Region No. 9

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PROJECT NO 33, HURON, S. DAK.

A GIANT IN THE EARTH

In the olden days, giants were supposed to roam the earth seeking whom they could destroy.

In this day and age there is a Giant abroad in the land doing more damage than all the fabulous giants could have done had they been as powerful as they were imagined to be. This roaring, devastating, devouring monster is the GIANT EROSION, and here is what he has done and is still doing to destroy Humanity:

"Three billion tons of soil--enough to fill a train of freight cars girding the earth 10 times at the equator --are washed and blown from the fields of this country every year.

"More than 300 million tons of the richest soil on earth -- soil stripped from the fertile fields of the Mississippi Valley -- are dumped each year into the Gulf of Mexico by the mighty Father of Waters.

"Four hundred million dollars is the estimated annual toll of erosion in terms of money value.

"Fifty million acres of once fertile farm land -- an area almost equal to the combined extent of Pennsylvania, Massachusetts and Connecticut -- have been completely destroyed and abandoned.

"One hundred and twenty five million areas more have been seriously impoverished by loss of productive top-soil.

"Two hundred thousand acres are being abandoned every year because erosion has rendered them barren and unfit for productive cultivation."

And now is the time for every man to become a "Jack the Giant Killer", for the GIANT EROSION is still roaring through the Land.

J. G. H.

THE DAKOTA ZEPHYR

Published Monthly
For the Benefit of Soil Conservation Cooperators
By the Staff of Soil Conservation Project No. 33
United States Department of Agriculture
Huron, South Dakota
H. J. Clemmer, Regional Director

Editor: J. G. Hutton

Contributors: Members of the Staff

November 15, 1935

Special Edition

This special edition of the Dakota Zephyr is prepared for distribution at meetings of people who are interested directly or indirectly in the conservation of the soil. It is composed chiefly of pages from the first five numbers of the Zephyr published from June to October, 1935.

There has been a demand for definite information concerning the soil conservation program in connection with the demonstration projects, consequently, it seems best to include in one special number of the Zephyr some of the more important general information previously published.

It is hoped that readers may feel free to ask questions if further information is desired.

-----O-----

The soil is the source of food and clothing supplies and those who produce agricultural products can exchange them for articles manufactured by people who are so situated that they can not produce their own food and textile stuffs. A productive soil thus becomes the corner stone of our commercial structure and the supporting pillars of industry.

Any government or any business or financial program which exploits or disregards the soil is doomed. Think on the soil.

-----O-----

During the 300 years since the white man began to occupy this continent millions of acres of once productive land has been ruined. It is sad but true that where the plowman trod to produce our daily bread, his foot too often cursed the generous soil and left it barren and unproductive.

-----O-----

Why should man made in the image of his Creator despoil his heritage? Why, though he "subdue the earth" should he not "replenish it." Why should he destroy the means of life while seeking to support life? Why? Think on these things.

-----O-----

A good place to live is where we can make a good living and where the conditions are such that we can enjoy the living we make.

The Soil Conservation Service has as its aim the saving of the soil so that people may make a good living from it perpetually as well as the development of an environment in which people can live happily.

-----O-----

What does it profit us if we gain the whole world and lose our own soil?

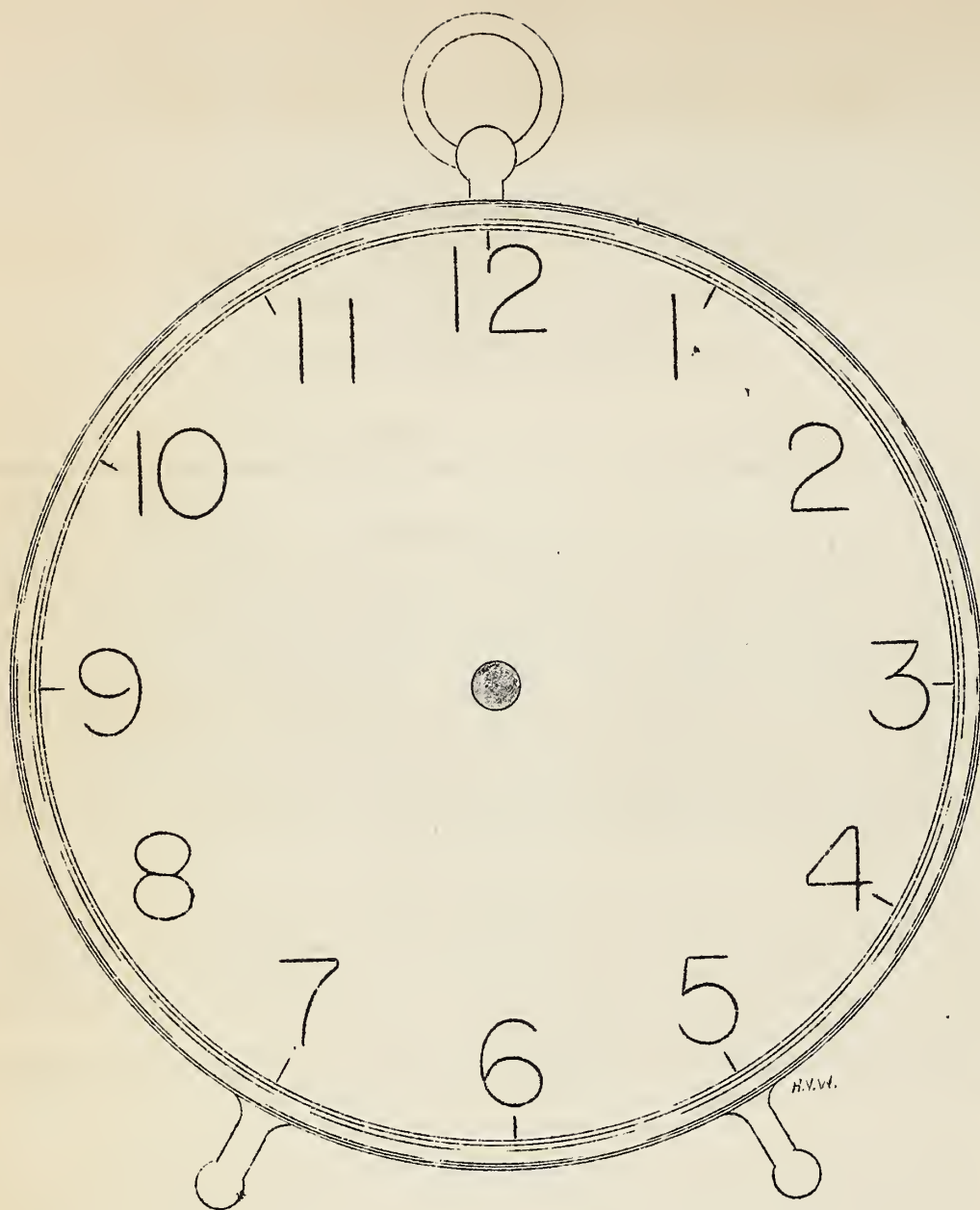
-----O-----

Soils and Souls are closely linked in this world.

-----O-----

An old Chinese maxim: "It is very difficult for a hungry man to tell the difference between right and wrong."

-----O-----



WHAT TIME IS IT?

A clock without hands is like a farm without business records. It continues to operate but it does not render its full service.

Telling the time of day by the clock without hands is a very difficult task. The same is true of trying to increase the income from a farm without a good business record.

Enterprises are only valued as a part of the farm business when they yield a return above feed, labor, and miscellaneous costs. Without a business record which shows what the return from each enterprise is, the farmer is as helpless as the farm wife would be trying to have dinner at Noon when the kitchen clock had been robbed of its hands.

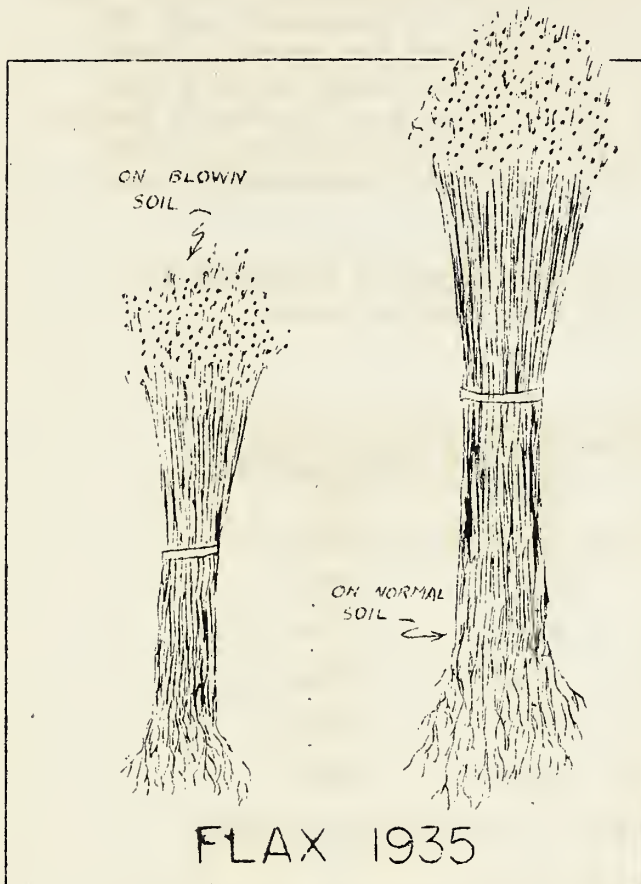
Efficiency is the slogan of the day. Continuous testing of enterprises by the returns they give will result in increased efficiency and a higher net farm income.

I. N. Chapman

Chief Conservationist in Farm Management.

ROBBERY !

WIND EROSION STEALS PLANT FOOD



Soils which have been subjected to severe wind erosion frequently show the results of the removal of the fertile top soil in decreased crop yields. The sketch of two bundles of flax shown here was traced from an actual photograph of flax grown in Beadle County. The short bundle on the left grew on a part of a field from which some of the surface soil has been removed, while the larger bundle grew where the soil has not been blown. Similar observations may be made in grain fields and corn fields.

Occasionally, good crops are reported from fields which have

been eroded. There are many examples of fields which last spring appeared to the casual observer to be ruined which have produced fair crops this summer. Careful examination shows that even though the soil may have been bare last year, no notable soil removal occurred.

In the last issue of the "Zephyr", Paul Emerson, Chief Soils Specialist, called attention to the fact that the nitrogen alone in the surface six inches of soil over an acre in this area is worth \$400.00 if purchased on the market as commercial fertilizer. Nitrogen is one of the essential elements of plant food and is found chiefly in the dark layer of surface soil so that when the surface soil is removed the nitrogen goes with it and the crop yield is reduced as shown in the sketch. When all surface soil is removed, there will be little or no crop.

Sweet clover has the power of taking nitrogen from the air and can be grown on blown soils. If it is plowed under, the nitrogen supply will be gradually increased and blown soils may again become productive.

In an article on another page of this issue, D. M. Hall calls attention to the amount of plant food removed from soils in the production of crops. In so far as the removal of crops reduces the nitrogen supply, the effect is similar to that of wind erosion. Farming can also become a system of robbery.

J. G. H.

HOW LONG A CROP ROTATION ?

The production of crops demands fertility elements in rather definite amounts. The higher the yield the greater the demand on the soil. The major plant nutrients are nitrogen, potassium, phosphorus, and calcium. If these are to be replaced in the soil they must be purchased, with the exception of nitrogen. Legume crops, as alfalfa and the clovers, have the ability to gather this nitrogen from the air and store it in a form that is available for plant use. This fact must be kept in mind in planning a crop rotation. Nitrogen is the most essential plantfood, is most expensive and most easily lost, yet most conveniently restored by proper rotations.

The nitrogen removed from the soil by crops is tabulated for yields which are about the average in the soil erosion area.

	Yield per acre	Nitrogen removed, pounds	
		Per Bushel	Per Acre
Wheat	15	2.02	30.3
Oats	30	1.04	31.2
Barley	20	1.10	22.0
Corn	30	1.48	44.4
Sweet clover	1 T.	50.0 T.	50.0

The rotations generally followed will remove the nitrogen as follows:

Corn and Wheat	74.7 lbs.
Corn and oats	75.6 "
Corn and barley	66.4 "

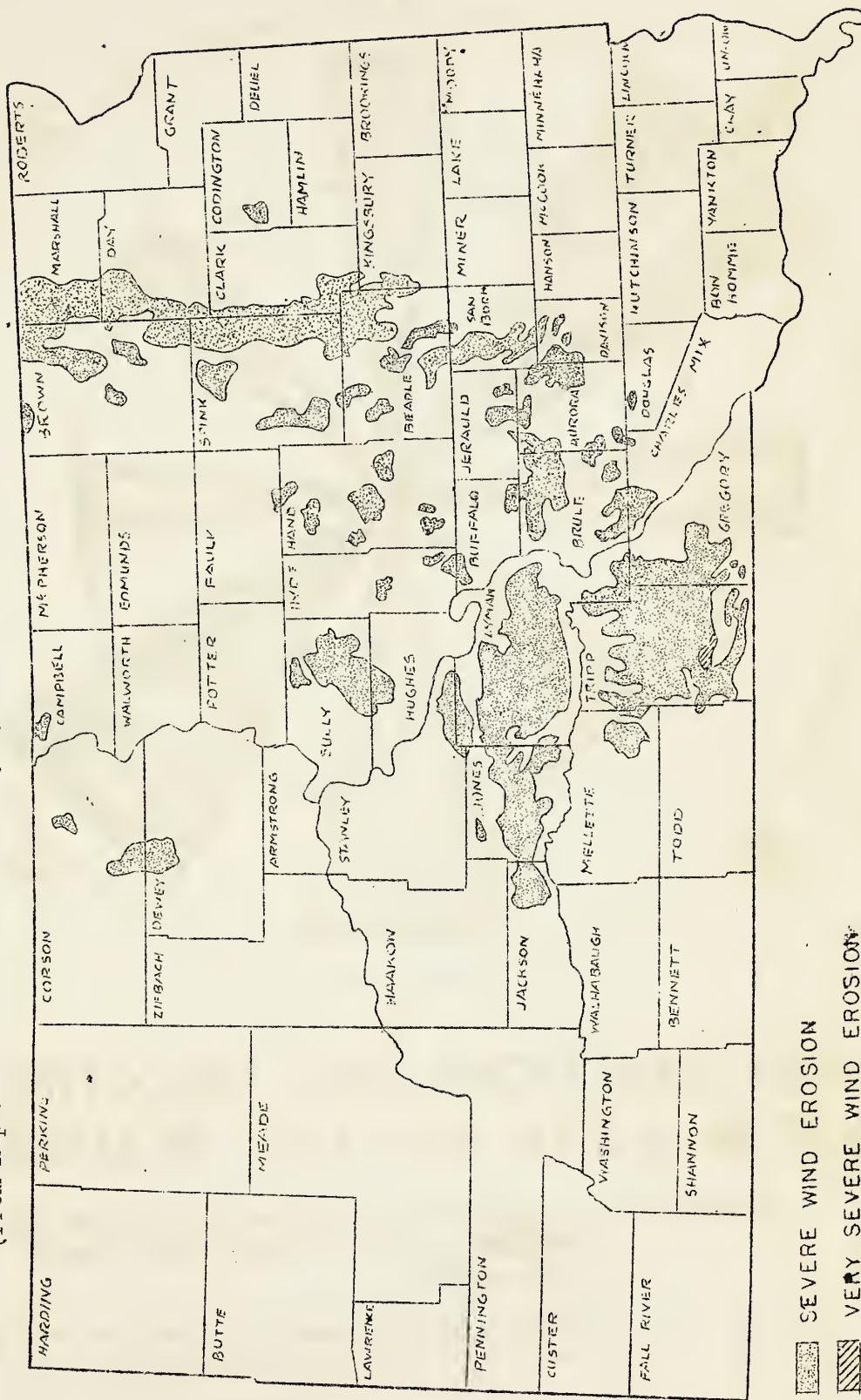
If these crops are placed in a 3-year rotation with sweet clover and the sweet clover will average $1\frac{1}{2}$ tons of dry hay plowed under, approximately 75 lbs. of nitrogen will be returned per acre of soil. Thus with yields as low as those indicated above, the nitrogen supply will just about balance. Any longer rotation will show a loss of nitrogen.

The other plant food elements will always be lost and can only be returned through the application of commercial fertilizers. The era of extensive soil mining is over and a permanent agriculture demands soil conservation which means fertility as well as moisture and organic matter conservation.

D. M. Hall
Agronomist.

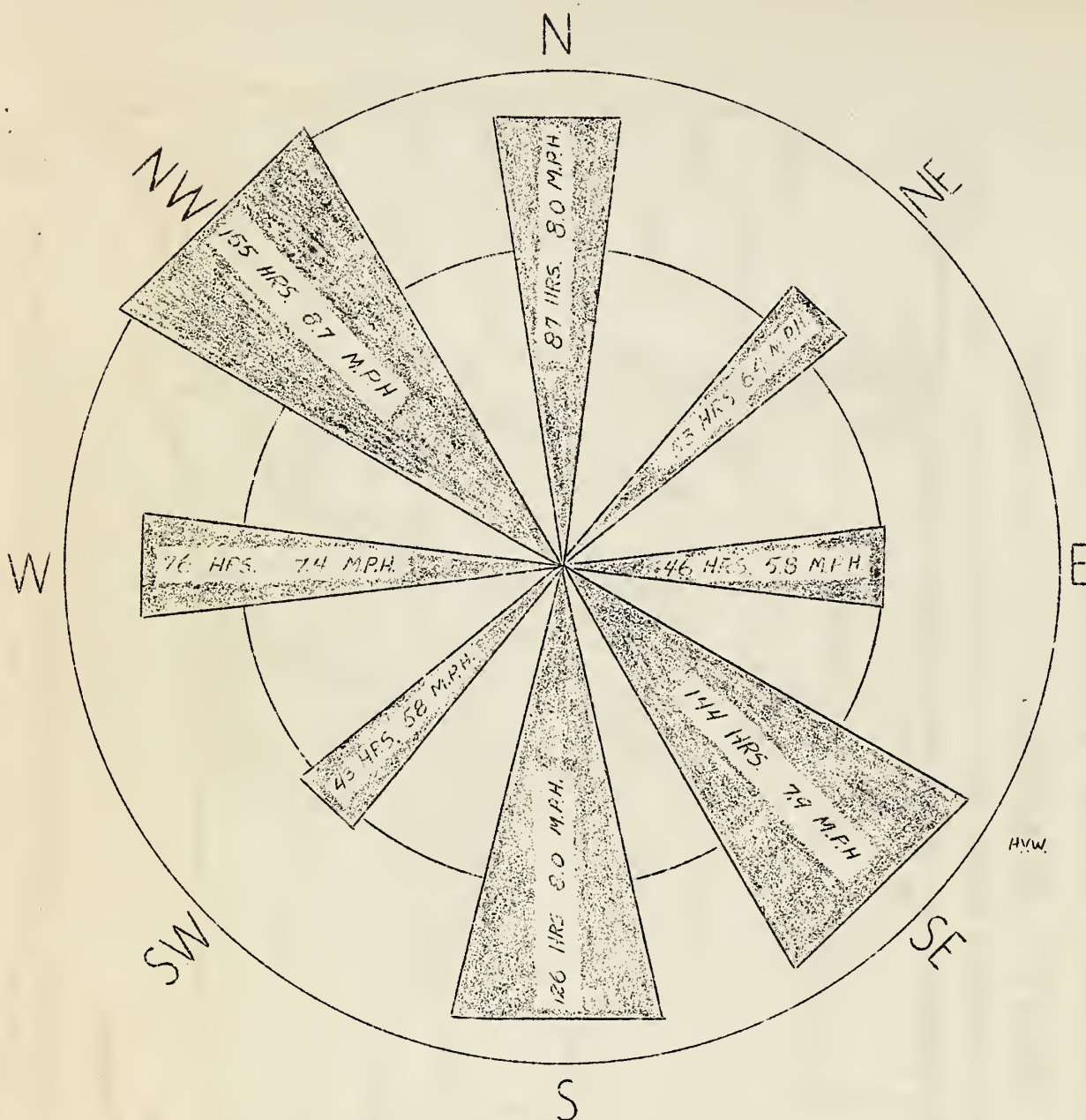
PRINCIPAL WIND EROSION AREAS IN SOUTH DAKOTA -----1935

(From Report of Soil Erosion Survey by Soil Conservation Service, U. S. D. A.-1934)



SEVERE WIND EROSION
VERY SEVERE WIND EROSION

The soil erosion survey made by the Soil Conservation Service in 1934 shows that about 4 million acres or 8.2% of the soils of South Dakota has been seriously injured by wind erosion. About 4 million acres or 4.7% of the soils of the United States has suffered serious injury from the same cause.



WIND DIRECTIONS AND VELOCITIES AT HURON S DAK. 1918-1930 INCLUSIVE

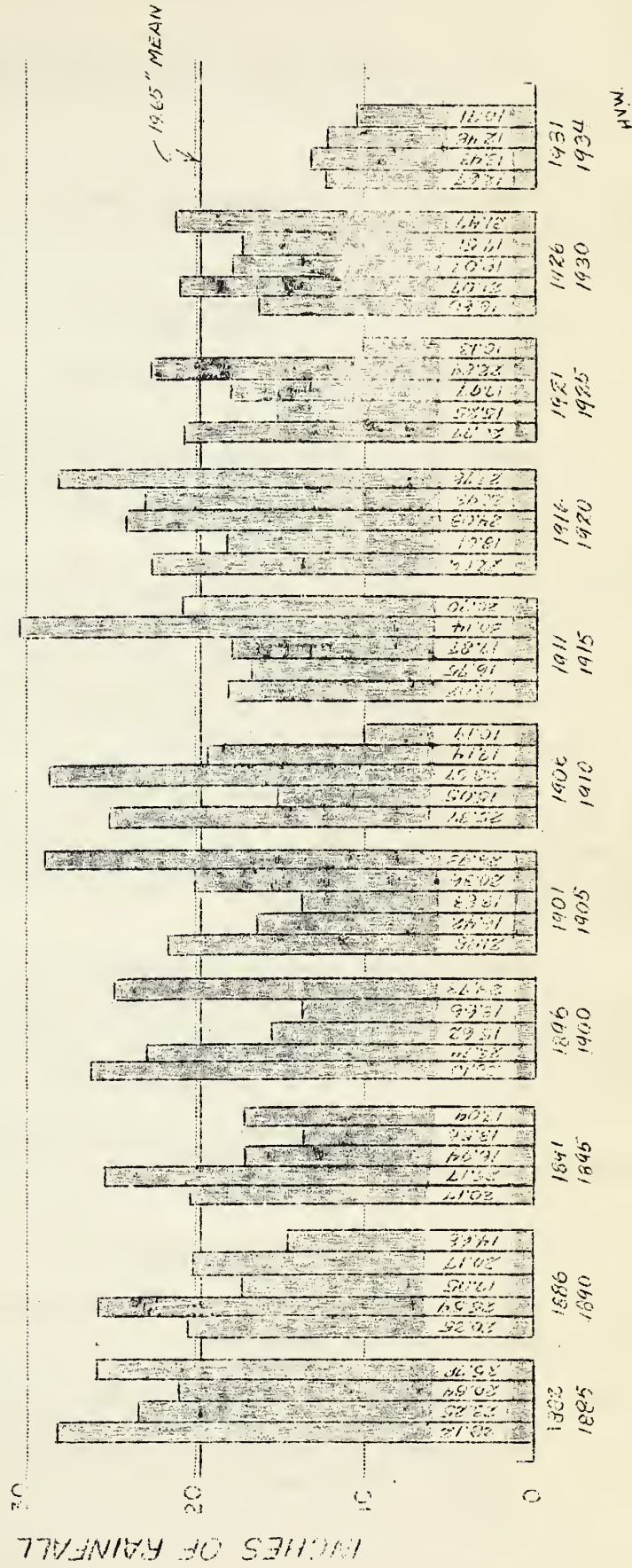
Chart No. 1 - Diagram Showing Relative Velocity and Direction of Wind at Huron, South Dakota, 12 year average.

Hours - Average number of hours per month.
M. P. H. - Average miles per hour.

P. Emerson
H. Tower

ANNUAL RAINFALL IN INCHES HURON, S. DAK. 1882 TO 1934

NOTE: "RAINFALL" INCLUDES ALL MOISTURE - RAIN AND MELTED SNOW



H. E. Tower - Soil Conservation Service, U. S. D. A., Huron, South Dakota

WHAT IS SOIL EROSION ?

Soil erosion is simply the removal of soil from land by the action of the wind or running water.

Wind Erosion

Wind moves the soil in two ways:

- (1) It carries the finer particles entirely away in the form of fine dust which rises high into the atmosphere and shuts out the light of the sun. This dust is usually the more fertile part of the soil.
- (2) The coarser particles of the soil are too heavy to be carried bodily by the wind and are rolled along the earth's surface forming drifts where the wind encounters obstructions. These accumulations of soil form the spectacular drifts burying fences, machinery, buildings, trees, and crops. This is usually the less fertile part of the soil.

Where soil is showing any tendency to blow or drift, even under the highest wind velocities, definite precautions should be taken at once to keep the soil covered with crop throughout the year and the soil should be roughened at right angles to the strongest winds while the crops are getting started.

Soil blowing is just as great a menace as a prairie fire and should be controlled just as promptly. All other work on the farm should be stopped, if necessary, when the soil begins to move and every effort should be made to stop the soil movement. An early recognition of this fact will save many grain fields.

To keep bare soil from blowing it must be kept rough. It must be kept rough until a crop cover can be established.

Water Erosion

Water moves the soil by carrying it along as it flows. The movement occurs in two ways:

- (1) By the formation of gullies, or ravines, in the soil which cut up the fields so that they cannot be farmed and in the long run through their growth in length, width, and depth remove all the soil and the subsoil.

- (2) By sheet erosion. This is the removal of the soil in sheets without the formation of gullies. Sheet erosion may proceed almost unnoticed until the top soil becomes so thin that crops can grow but poorly or perhaps not at all.

If there is any sloping land in your vicinity it will pay you to observe what is happening on the sloping fields. If you find soil washing down into the lower places you may know that an insidious soil disease is already setting in, namely, soil consumption or soil ruin by the actual removal of the soil itself from the slopes, where it is needed, to the low places where it is not needed and where it actually does damage.

If you will observe closely you will see that drilling grain or planting and cultivating corn up and down the slopes hastens greatly the soil removal process.

We are so accustomed to farming parallel with the section lines that it is difficult to think of farming in any other direction, but much can be done to prevent erosion by water by seeding across the slopes instead of up and down the slopes.

Soil erosion surveys covering the entire state show that there are large areas in which soil erosion is a serious problem. In the loessial soil area in the southeastern part of the state there are many farms suffering from gully formation and sheet erosion as are those outside the loessial area along tributaries of Missouri River. Wind erosion is much more general and over large areas in a number of counties much damage to soils has occurred.

It should be stated that there are large areas of soil in the state where no serious damage to the soils by the wind or water has occurred. For this reason, it is often difficult for people living in such localities to appreciate the fact that much good land has been and is being ruined by erosion. The fact remains, however, that while many eroded farms are still in operation the yields are decreasing and that there are too many sets of good farm buildings standing vacant on farms from which much of the fertile top soil has been removed.

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I N V E S T M E N T.

"If the art of agriculture has ruined land, the science of agriculture must restore it; and the restoration must begin while some farmers are still prosperous, for poverty-stricken people are at once helpless and soon ignorant. Outside help will always be required to redeem impoverished soils, for poverty makes no investments, and some initial investment is always required for soil improvement."

WHAT CAUSES SOIL DRIFTING ?

The question is frequently asked as to why the drifting of soils is so much more common than it formerly was. Many people think that it is due entirely to the dry weather which has prevailed during the past few years and that when the rainfall becomes normal again soil drifting and dust storms will cease.

It is true that the drought has had a direct influence as well as indirect influences on the increase in the movement of the soil by the wind but it is not the chief cause.

Soil is made up of grains of mineral matter of various sizes varying from gravel to clay. Mixed with the mineral matter is a considerable amount of organic matter commonly called humus. This material consists of the remains of partly decomposed plants and is spread over the surface of the soil grains as a thin film. It is dark colored and so gives a dark color to the soil grains which themselves are generally gray in color. The surface or top soil in this part of the country is always darker in color than the subsoil which is usually gray or yellowish gray. The difference in color is largely due to the amount of humus contained. The top soil contains much humus while the subsoil contains very little.

The humus film around the soil grains has a slightly sticky nature and after being wet it shrinks and holds the soil particles together in the form of little lumps or granules. Sometimes these are large enough to be called clods. These granules are generally large enough to resist movement by the wind.

Since the soils were first plowed a large part of the organic matter in the films has been consumed and the films are thinner than they were at first. The humus is less sticky than formerly and so when the soil is moistened and then dries again the single particles do not hold together but fall easily apart so that the wind is able to move them readily. In the sandier soils humus is the only sticky material holding the soil grains together, but in the heavier soils there is also some very fine clay which has a sticky nature, hence these soils generally remain granulated even after some of the humus is removed. This is the reason that the heavier soils are generally not blowing so badly as the lighter sandier soils although there are some places in which the granules of these heavier soils are small enough for the wind to blow or roll along the surface of the ground and form great drifts.

Investigations at the state experiment station show that as much as 29% of the humus of the soil may disappear in 21 years under the ordinary methods of farming. The state soil survey has found similar conditions existing in many parts of the state.

If rainfall alone held the particles together all would be well but it has just been shown that the humus in the soil plays

a large part in holding them and since the humus is much scarcer than formerly the soil granules have broken down and will continue in this state even after the rain comes again. This condition will last until new organic matter has been returned to the soil and has had a chance to decay. For these reasons, it may be seen that more care must be taken with the soils which are blowing or are beginning to blow than was formerly necessary.

The soils were formerly protected by a covering of vegetation which served to keep them covered and also to provide much root material in the soil which holds it together. The breaking of the sod destroyed this cover and the general methods of farming have not maintained a cover on the soil except for a portion of the year. Fall plowing and summer fallowing have helped to destroy the vegetative cover which might have developed from weeds and other wild vegetation. Grasshoppers and severe drought have been important factors in destroying native and cultivated cover crops.

Burning the stubble, stalks, and straw which was formerly generally practiced has prevented the return of organic matter to the soil and has hastened the rate at which humus has disappeared. All of these things taken together have resulted in great changes in the soil itself. These things must all be taken into consideration in planning for wind erosion control.

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PROGRESS IN WOLSEY AND SHUE CREEK AREAS

Notwithstanding the late start last spring and certain unavoidable delays during the summer, the progress of the work in the Wolsey and Shue Creek areas has been very satisfactory. The following statement of November 9, 1935 indicates the live interest of farmers in the cooperative program.

Total number of farms under contract	--	173
Acres in farms under contract	--	42,984
Total number of applications not yet worked	--	157
Total number of acres in applied farms not yet contracted	--	42,745

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"It is the first business of every farmer to reduce the fertility of the soil, by removing the largest crops of which the soil is capable; but ultimate failure results for the landowner unless provision is made for restoring and maintaining productiveness. Every landowner should adopt for his land a system of farming that is permanent,-- a system under which the land becomes better rather than poorer."



H.V.W.

FIRST STEPS

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Many fields in the project area are so rough owing to the formation of soil drifts by the wind that it is impossible to use farm machinery for seed bed preparation or seeding until the surface has been leveled. After leveling has been finished, the soil will move again with the wind unless precautions are taken to prevent it.

Fields with soil accumulations like those shown in the first sketch are leveled by the use of a caterpillar tractor and a large blade, the accumulated soil being spread out until it is possible to cultivate the field. The middle sketch shows the results of such leveling.

After the field is leveled, a lister is used to furrow the field and leave a uniformly roughened surface to impede the velocity of the wind so that it is unable to move the soil. The right-hand sketch shows the field after listing.

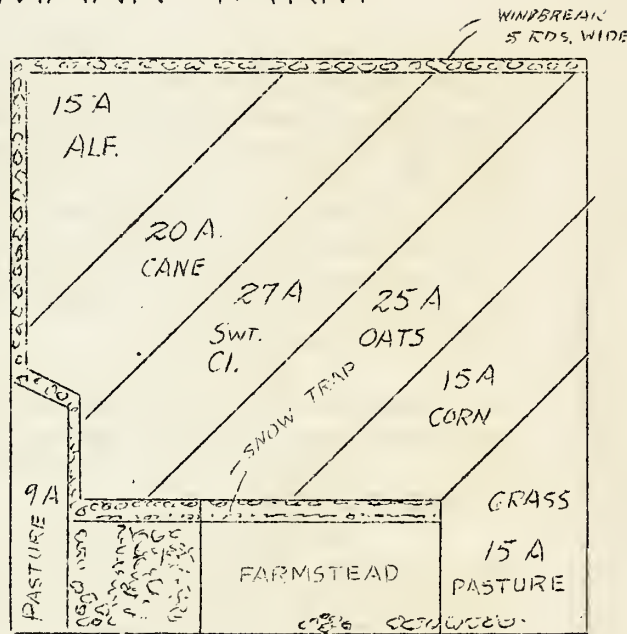
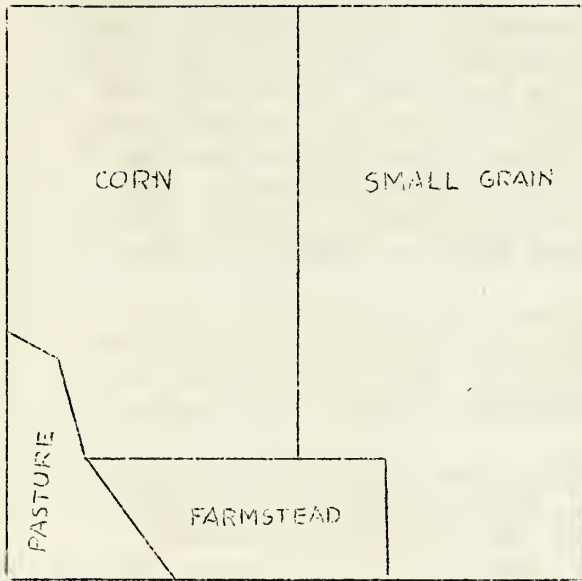
Corn or cane may be planted in the listed furrows. These crops will furnish protection to the soil during the summer and the following winter. In several instances, oats has been seeded before listing and has furnished a good crop cover. Rye will probably do much better for late seeding as it will live over winter.

On most soils, listing will be necessary only until a crop rotation giving year-around protection is installed, or a permanent grass cover is established. On sandier soils, it may be necessary to use the lister whenever corn or cane is planted.

Listing is, no doubt, the most expensive method of roughening the soil, but it is, in many cases, also the most efficient. It is the only method to use where soils drift badly. On some of the heavier soils, successful roughening has been accomplished by using a properly adjusted cultivator.

* * * * *

PLAN OF AUGUST JUNGEMANN FARM



BEFORE

&

AFTER

COOPERATIVE AGREEMENT WITH THE SOIL
CONSERVATION SERVICE. — U.S.D.A.

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Every farm is a separate problem. This sketch illustrates the adjustment of Mr. Jungemann's farm to meet the requirements of efficient utilization of soil types, the control of drifting soil, good crop rotation, and diversification. In the case of many farms, the recommended changes may be much simpler and in others more complex. The simplest readjustment consistent with the results to be obtained is always to be preferred.

THE SOIL CONSERVATION SERVICE IN SOUTH DAKOTA

By H. J. Clemmer, Regional Director.

The Soil Conservation Service, a branch of the United States Department of Agriculture, under the direction of H. H. Bennett, has established three wind erosion control projects in the state of South Dakota. The first of these demonstration areas was established January 15, 1935, in Beadle County, with Huron as project headquarters. This area consists of two projects, the Shue Creek Area consisting of 144,000 acres and the Wolsey area consisting of 46,000 acres. The last area, established in July, 1935, has an extent of 49,280 acres and is between Winner in Tripp County and Dixon in Gregory County. Winner is headquarters.

In addition, to the wind erosion control projects, the SCS has under its direct supervision three CCC Camps which are doing water conservation and erosion control work. Camps are located at Huron in Beadle County, Crow Creek in Buffalo County, and Alcester in Union County.

The Soil Conservation Service project activities include Engineering, Agronomy, Soils, Forestry, Farm Management, Game Conservation, and Education & Information. The activities involved are carried out with close cooperation with the State College, Extension Service, and all Government agencies.

Engineering involves all operation of equipment, used in leveling field and fence drifts, terracing and measures dealing with water conservation, flood control and gully control structures.

Agronomy deals with the crop rotation system involving arrangement of fields, strip cropping, contour farming where practicable, seeding of certain areas to grass or legumes and such temporary or permanent measures required in the control of wind erosion.

Soils men map each individual farm, giving complete farm layout, fence and building locations, contour and degree of slope, and the different soil types on the farm. The soil type classifications are used by the agronomists as a basis in working out a suitable crop rotation for each farm.

The Forestry branch makes a forestry survey, working out with the farmers a suitable tree planting program aimed at the ultimate growing of windbreaks, and shelterbelts for farm protection.

The Game Conservation activities are closely allied to the Forestry work in the planting of suitable seed bearing trees and shrubs for bird food and cover. Those plantings aid also in wind erosion control.

Farm Management deals with the farm program, including all activities in the general practices, and the keeping of farm records. This work is handled by the contact men who go to the farms, make all contacts, explain the program and get the contracts signed.

Education and Information prepares news letters, press articles, and radio addresses. Speakers are supplied for meetings where information about soil conservation is requested. All work is done in close cooperation with the Extension Service of the State College.

PROGRESS OF THE SOIL CONSERVATION PROGRAM

In addition to the Wolsey and Shue Creek Demonstration Areas, authorized January 15, 1935, and comprising a total of 190,000 acres, three new project areas have been approved by the Secretary of Agriculture in this district. These three new projects are located as follows: One near Great Falls, Montana, one near Park River, North Dakota, and the third near Winner, South Dakota.

The Montana project is known as the Power-Dutton area and consists of 32,000 acres. Great Falls will be the project headquarters. This project comprises two areas separated by a strip of grazing land several miles in width. The limited amount of contracted acreage is 25,000 acres.

The North Dakota project with project headquarters at Park River, North Dakota, is known as the South Branch Park River Area. This project, situated in the watershed area of the South Branch of the Park River Area, has an extent of 51,320 acres with a limited contracted acreage of 25,000 acres. Within the area, a CCC Camp is now operating, water conservation being the major activity.

The third project is located in Tripp and Gregory counties, South Dakota, between Winner and Dixon. The extent of this area is 48,900 acres with a contracted acreage limit of 25,000.

All three of these projects are for the demonstration of wind erosion control practices. Project activities have been started and are now well under way. Labor on these projects will be taken from the relief rolls. Certification of eligibles will be obtained from the United States Employment Service, through cooperation with the various W.P.A. offices. In accordance with the President's plan, the Security Wage Rate will prevail.

Additional new projects will have to be requested by the Soil Conservation Associations and the applications for such projects sent to the State Coordinator, Huron, S. Dak. If these project applications are approved by the State Coordinator and his committee, consisting of the State Extension Director and Director of Experiment Stations, they are then transmitted to Washington through the Regional Conservator for final action.

It is important that Soil Conservation Associations be organized and encouraged. The personnel of the Soil Conservation Service will be glad to assist in the organization of such associations and to cooperate with county agents wherever cooperation is desired.

H. J. Clossner,

Regional Director.

WHAT IS SOIL

Soil is the outermost part of the crust of the earth which consists of loose material derived from the natural breaking up the rocks by the physical and chemical agencies of weathering. This material has been modified by the action of plants which have grown upon it and whose roots and bodies have become mixed with the rock material.

It takes thousands of years for a soil to develop upon the loose, fine-grained rock material, because at first the plants that can grow upon the raw rock material are limited in their growth and the rate of accumulation of organic matter from the decaying plants is very slow. However, if time enough elapses during which the conditions are favorable for plant growth, partly decomposed organic matter will accumulate in the top soil and change its color to a darker hue. Where the accumulation goes on for thousands of years, the dark colored top layer may become several inches or even a foot or two in depth. This is the "top-soil" which contains most of the nitrogen accumulated from small amounts of nitrogen compounds coming down in the rain and from the action of bacteria in the soil and on the roots of legumes. Most of the chemical action which dissolves the mineral plant food for the use of plants goes on in this layer.

Since the top-soil is the part of the soil in which most of the feeding of growing plants goes on, it is easy to see that it must be preserved if crops are to be grown. It is a fact that this layer of top-soil is the only defense humanity has against starvation and nakedness. It is also true that the subsoil underlying the top-soil does not possess the crop producing qualities of the top-soil and could not change to top-soil except after centuries of action by topsoil-forming processes.

The top-soil varies in texture. It may be sand, sandy loam, loam, silt loam, clay loam, or clay, depending upon the sizes of the soil particles and the percentage of each contained in the soil.

The subsoil may vary as to texture and structure, that is, the size and arrangement of the soil particles. Subsoils may range from gravel to clay and it is partly on the basis of the subsoil that soils are divided into groups and given names so that they may be described and studied. One of these soil groups is usually called a soil series and has the same kind of subsoil throughout the textural series of top-soils. In the soil survey reports, descriptions of these soil series are given in detail.

SOIL SURVEYS

A soil survey consists in a careful examination, classification and mapping of the soil types of a given area. Such surveys have been conducted by the soil survey of the United States Department of Agriculture in cooperation with the soil survey organizations of the several states.

The cooperative relation has been highly satisfactory because, while the special interests of the several States have been represented in the study and mapping of the soil, the Federal agency has supplied part of the funds and personnel for the survey and through its correlation committee has arrived at a system of soil mapping that is uniform and consistent throughout the nation.

In South Dakota, the State Legislature appropriated funds for soil surveying for eight years. During this time nine counties were surveyed at a cost of less than two cents per acre to the state. These appropriations were discontinued in 1927.

A soil survey map is usually made on the scale of one inch to the mile, a section of land being one inch square. On this scale, it is possible to show all the important soil areas on every farm as well as to indicate slopes and drainage features.

Accompanying each soil map is a report in which careful descriptions of all soil types is included together with a statement of the best probable utilization of the soils mapped.

The soil map is the best base map for use in studying cropping systems, tree plantings of all kinds, agricultural adjustment, sociological and economic investigations, and for land valuation for taxation and other purposes. It is not an extravagant statement to say that there can be no permanent adjustment of people to their environment -- no permanent effective planning until a detailed soil map is available for every county.

The South Dakota counties for which soil maps and reports are available are Beadle, McCook, Union, Douglas, Hyde, Walworth, Brown, Grant and Moody.

Said a Beadle County farmer last March: "We must have our daily bread! And if we do, we can take care of ourselves, -- and some one else besides."

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An old adage: "Ask your banker." Well, ask him what he thinks about saving the soil. He will tell you.



H.V.W.

GOING UP IN SMOKE

There are still farms in the northern Great Plains on which straw, stalks, and stubble are being burned in spite of the fact that we should have learned long ago that such a practice is wasteful and destructive.

These so-called "waste" materials, when plowed under, are the chief means of maintaining the soil organic material, loss of which reduces the absorptive and water-holding power of the soil while allowing the soil to break down into small granules or separate grains easily moved by wind or running water, thus making soil erosion easy. Continuation of this practice will add to the millions of acres of once good land already ruined.

No soil conservation program can be permanently effective unless it provides for the maintenance of the organic matter supply in the soil.

Question: - Has your farm been going up in smoke?

J. G. H.